

# EVOLUTION *owner's* newsletter

Editor, Doug Meyer

December 2014

*LANCAIR*

Layout and Graphics, Ron Hart

## Information for the Evolution Owner and Builder

Redmond, OR; December 24, 2014

### Tick Tock..... Tick Tock.....

Pressurization loss has been a big topic lately after a couple of well publicized fatal accidents. I took advantage of this and as part of a presentation I did at EPS's recent Annual Recurrent Training Seminar in Charleston NC, I did a short presentation on how I prepare for such an emergency. The "gist" of this is that when I plan on operating in the flight levels I have a Mountain High "mike mask" with an integral microphone (which is patched into the Bose plug with a Mountain High splitter) and plugged into a Mountain High O2D2 demand regulator which is plugged into the ship's emergency O2 port and turned on. Part of the preflight is to turn on the bottle (located under the baggage floor in the plane I fly) and verify that there is O2 available with the flip of the toggle switch at the panel. During my cockpit pre-flight check list I verify that the oxygen is flowing on demand. All the above mentioned



hardware is left plugged in and at my lower left. I have all the hoses "folded" and held in place with a rubber band that allows me to simply hit the toggle and pull the mask up to my face, flip the head set back and put the mask on. Pretty simple, right? It is. I've practiced it- sitting on the ground. Which is why I am embarrassed to say that I did not do such a good job of that when I actually may have needed to do it.

I was just flying up to KSQL (San Carlos CA- Bay Area) from Palm Springs after the recent Flying Magazine Summit to do a couple demo flights on the way back to RDM. The weather was perfect VFR, and going out of the LA area is a lot easier VFR with Flight Following than it is going out on a clearance. Because of that choice, and the

fact that I was only going to 16,500 in severe clear, I did not "set up" my O2.

So there I was, enjoying the morning at 16,500 listening to Fox News on the XM, a bit north of Bakersfield, when WOOSH! The door seal deflated. WTF! Door seal? Tick Tock.... verified by the daylight around the seal... and my ears suddenly climbing

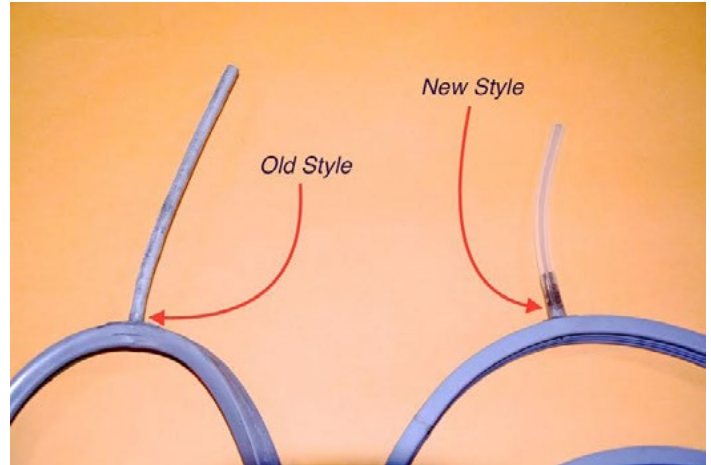
about 11,000 feet in 2 seconds Tick Tock.....Tick Tock..... I reach for the mask like I practice ... Oh, forgot. It's not there. OK, I'll get the plastic mask... Tick Tock.... Tick Tock..... It's not plugged in. Fumble, fumble. Plugged in now... Tick Tock....Tick Tock..... Realization--- I didn't turn on the bottle, crap!... Tick Tock....



## Tick Tock..... *continued*

Tick Tock..... Forget the effing mask you idiot- just GO DOWN. "LA center 424 Sierra Mike, I AM DESCENDING" Power to idle, stick forward, "424SM You said you are descending? Do you have an emergency?" "Stand by" Establish pitch, A/S, trim... Tick Tock... "No sir, I do have a pressurization issue but am not declaring an emergency. I will level at 12.5". Airspeed top-of-the-green 220 indicated, Tick Tock.....Tick ..... Shallow out the dive around 13,500.....Level at 12,500... A/P engaged. "Center 424SM level 12.5- on course to San Carlos".... Tock. Episode complete. That all took about 90 seconds. This was not an emergency, it was an "occurrence", but, nonetheless I am not happy with my performance. Lessons Learned:

- O2 - Check the qty., have the bottle on, and have a mask available every flight! What if I had smoke in the cockpit, or I was over the spine of the Sierra....
- Having something happen, even a minor thing, can be momentarily confusing and that takes more time than you might guess.
- Understand your priorities at the moment. I wasted time messing with the unavailable O2, forgetting about my nonstandard set-up, instead of just GOING DOWN right away. From VFR at 16.5 the O2 wasn't really the priority as long as I could descend. Above 180 the O2 is absolutely the priority.
- Any non-standard occurrence is just that; non-standard. Try and keep your profiles "standard", but still, any emergency will be unique in some form. There is nothing wrong with unique personal procedures as long as you keep as standard and FOLLOW THEM!



## The Door Seal

Oh what's that? You want to know about the door seal? Here's the deal on that.

As far as I know, there have been two main door seal failures, plus 3 seals damaged by use or human intervention (punctures). Both failures have occurred at around 500 hours and were original seals.

The seal on the airplane I was flying was installed about 500 hours and 4.5 years ago. It failed at the joint of the hose nipple to the seal itself. There have been two vendors for these seals p/n 244-0017, and which are the same as are used in some certified applications. Vendors are Trelleborg (the original) and Dynamic Rubber, which is what we currently stock and use. The Dynamic seal is superior in that it has a threaded brass reinforced nipple where the air hose joins the seal and the presence of this brass nipple is easily determined visually. The failed seals have a vulcanized rubber inlet tube nipple. Given that these door seals failed at 500 hours, I would suggest including them in your annual condition inspections and possibly doing a preemptive replacement at some time. These seals do have a manufacturer's warranty but the failure dates are well outside that window.

A seal replacement is not difficult but it is tricky to do nicely if you have not done it before. A professional builder or Lancair would be the best bet for this work. You could remove the door yourself and deliver the door(s) to them if you wish. The job takes about 8 hours of labor over 3 work days (due to setting time required for the adhesive).

## Understanding your Fuel Pump(s)

**H**ow many fuel pumps does your Evolution have? Some would say two some would say three. How many do you need? The fact is you need two, and all Evolutions have at least two. Some have three. There is one mechanical pump integral with the engine's fuel control unit (FCU). This is referred to as the "engine driven fuel pump". There is also an electrically driven fuel pump, the "airframe boost pump" in the spar box under the front floor. Some have a third "back up" mechanical fuel pump on the lower left accessory drive pad on the back of the engine. But, it is the pump at the FCU that delivers the high pressure fuel to the nozzles in the combustor. If the electrical boost pump fails does the engine quit? No. If you don't turn on the electrical pump can you start the engine? Yes. But, if the engine driven FCU pump fails? Well, that's a flame-out. So, why have the third pump? That's your choice. It's a mechanical backup to the electrical boost pump. To quote the P&W manual, "If the airframe fuel boost pump fails or is left off for an accumulative time of 10 hours, the engine driven fuel pump must be removed and replaced. The removed pump should be sent to an approved overhaul facility." The purpose of the electrical boost pump is to supply the FCU mounted pump with adequate flow "at a minimum vapor/liquid ratio of 0.1." Without going too far into the woods, vapor/liquid ratio determines the tendency for the fuel to develop vapor bubbles at low pressures. Known in gasoline engines as "vapor lock", it is why we run the boost pumps in hot/high conditions. Kerosene has much less of a tendency to vaporize, but this COULD occur operating with a failed boost pump in extremely hot high altitude conditions, but it is highly unlikely if even possible.

I bring this up now because the mechanical fuel pumps are getting scarce and the re-mans are very expensive, new pumps even more so, because there are fewer and fewer applications. The design of these pumps has changed little since they were used on large Radial engines 50 years ago.

Even though there have been no known failures of the electrical pump that we are now using, we are working on a program to improve this system. As I mentioned, your electrical boost pump could fail and the engine will continue to run, you may not know that the pump has failed. To make that system a bit more purposeful we are moving the Fuel Pressure transducer to a position between the electrical pump and the FCU and we will soon be incorporating a fuel pressure annunciator warning in your available ALERTS on the PFD. This warning will let you know if your fuel pressure FROM the boost pump is less than 15 psi., (Normal pressure being 35psi). We've chosen this number as an alert that your boost pump may be failing before it does fail. Second, we are working with a pump manufacturer a new, purpose built, electrical boost pump that is much more robust than the "off the shelf" pump we are now using.

We'll keep you posted

## Exhaust Stacks

**T**he Polished Stainless Steel Frakes exhaust stacks that help your Evo look so sexy are not just like shiny hubcaps. They are more aerodynamic, slightly increase thrust from the exhaust, and reduce the soot buildup on your fuselage and wing. They are made from thicker gauge,



better grade stainless material than those found on most standard installations (Beech, Piper, etc.) and carry a 7 (!) year warranty. Frakes will repair, or if not repairable, replace them at no charge within that period. For those of you that may not know, Frakes also offers a reinforcement



## Exhaust Stacks... *continued*

ring that fits on the back side of the flange on the Exhaust Housing and will prevent cracking of the exhaust flange. This is not a big deal on new or moderate time engines. But if you have a used or re-man engine with hours in the thousands you could experience a cracked housing flange as a result of improperly tightened stacks. One of our owners did, and I can tell you that the exhaust housing is a VERY expensive part to change out. We will soon be including the reinforcement rings in the 2015 firewall forward kit pricing. You can order the set of reinforcements from us for your plane for less than \$300. And if your stacks are getting a little dull, go to the Oct. 2011 Newsletter for an article on shining them up.



## In case you wondered.....

About landing the Evolution on the grass with the new RSLG optional tires and stronger nose gear, it is REALLY fun. I would imagine that most of you have not operated off turf or dirt. Do not be tempted to do it with the standard "narrow" tires. That would not work well. The wider tires are a must to allow the tire to float on top of a soft

surface. Due to the increased rolling resistance drag, stopping distances are shorter, but takeoff distances are longer and given anything other than a groomed dry surface can be much longer. Long or wet grass may require advancing power above the normally recommended 1300 pounds when possible during the takeoff roll as speed increases.

Just to put a finer point on it, this option is not intended for "bush flying". It is intended for designated runways that are not paved.

**And finally,** for what is sure to be a popular option, we are considering offering "on demand" flight attendants with all Evolutions. I am currently conducting interviews and will keep you posted.



## Back Issues of these newsletters

If this is your first Evolution Newsletter or if you would just like to review the past issues, you can download them at: [Click here](#)

Comments and responses please email:  
[dougml@lancair.com](mailto:dougml@lancair.com)